

Minutes from the NAI Icy Satellite Environments Focus Group

April 26, 2010

A lively meeting was held during lunchtime on the first day of AbSciCon. Over 30 people attended, and many more emailed their interest but were unable to attend. Unfortunately, we were not able to get a telephone installed, but that will happen next time, so we will have call-in capability. Kevin Hand was unable to attend, so Pat Beauchamp ran the meeting. Many thanks go to Peter Willis for taking notes and action items. I have listed all the action items at the end of these minutes.

The agenda was distributed last week and is reproduced below. One item was added, which was a discussion of the name of the group. A lot of people expressed confusion because the focus group name is associated with a NAI research group. So the first order of business was to choose a new name.

AGENDA

Introductions

Purpose and Objectives of the Group

Discussion:

- 1) Naming the group to avoid confusion with the existing NAI research group
- 2) Setting priorities for upcoming lectures and discussions
- 3) Polling the community for additional thoughts on how to structure the IWFG.
- 4) Appointing the 4-5 member steering committee (if agreed to)
- 5) A possible workshop for 2012 to focus on the target(s) of interest emanating from the Planetary Science Decadal Survey (or other topics).
- 6) Interaction with OPAG WG's
- 7) Relationship of IWFG to Other NASA Activities
- 8) Interaction with international community
- 9) Europa Surface Science Package Discussion
 - the scientific rationale and goals for surface science.
 - what instruments could fulfill those goals within the constraints of 100kg total lander mass and total instrument payload mass of <5 kg.

Summary and review of action items.

Pat described the background and the purpose/objectives of the group:

Background

- The Icy Worlds Focus Group was originally formed from the combination of the Europa Focus Group, led by Ron Greeley and the Titan Working Group, led by Jonathan Lunine.
- It was first initiated in 2005 and run jointly by Greeley and Lunine.
- The new charter now encompasses both Titan and Europa, as well as other icy worlds of astrobiological interest, such as those found on our own planet, Earth, and in the polar regions of Mars.
- The Icy Worlds Focus Group intends to encompass all icy environments to enable cross-fertilization between scientists in the various disciplines.

Objectives

- Icy Worlds Focus Group is a forum for the astrobiology community to discuss common goals in the study and exploration of satellites of the outer planets, and to exchange ideas from researchers in the broader icy world community of Earth and Mars.

Approach

- Face-to-face meetings of the group at AbSciCon,
- virtual web-based lectures and discussions on specific topics,
- periodic workshops. Tentative plan for one in 2012
 - Output from the workshop(s) will include abstract volumes of presentations and summaries of discussions.
- The results from the discussions will be particularly important in influencing and designing future missions.

All events, including the workshops would be widely announced and participation would be open to the scientific community, including participants from the NAI family, NASA, academia, industry, and other organizations.

Discussion about the name ensued and two names emerged as top candidates. The one chosen by the group was Icy Satellite Environments (ISE) – not exactly ICE, but close! So we are the NAI ISEFoG!

The attendees felt that the structure of the ISEFoG should remain flexible for the time being with Pat and Kevin leading the group. No-one felt that a steering group was necessary at this time and could be constituted later if need be. We discussed the topic of 'virtual' discussions and lectures and concluded that quarterly seminars/talks by both students and experienced researchers, preceded by a general discussion about group plans were optimal. So, the first of these will be webcast in June (at 9 am to accommodate international members, date tbd). We will start with the following organization and see how it goes:

Agenda for Quarterly Virtual Discussions/Seminars

10 minute discussion about Group administrative issues and future plans
10 minute student presentation
5 minute student presentation discussion
30 presentation by experienced researcher
5 minutes discussion of presentation.

Please send suggestions for presenters (students and researchers) and topics to Pat and Kevin, so that we can arrange the first discussion meeting.

We discussed the notion of a workshop in 2012 – or possibly earlier. It was felt there were enough workshops/meetings on individual bodies, such as Europa and Titan, but that astrobiologically-focused comparative planetology workshops were limited, so we should move in that direction. Topics suggested for the workshop were (others still welcome):

Workshop Topics

Comparison of oceans on icy satellites
Age dating of icy satellites
Chemical processes on icy satellites
Nature of astrobiologically useful orbital measurements
Sea-ice and sea-water interactions

There was a strong sentiment to have the workshop in conjunction with an OPAG meeting, so Pat took the action of coordinating this. People felt that the interaction of this group to OPAG should be strong and indeed to any other NASA or international group that was interested in this topic. There were European members present and all felt that at the working group level there was a lot of interaction but more could be done to increase collaboration. Pat will take the action of contacting some of the European Astrobiology centers and investigate what more can be done to further collaboration.

The last topic was the discussion of the possible Europa Surface Science Package

- the scientific rationale and goals for surface science.
- what instruments could fulfill those goals within the constraints of 100kg total lander mass and total instrument payload mass of <5 kg.

Pat pointed out this was not necessarily something that *will* happen, but that we needed to provide some input to Kevin, who is leading a study on this topic. She suggested that a possible comparison was DS2 – not that this Europa package should be a penetrator - but that was the type of instrumentation that could be expected to meet the mass and power constraints.

During the discussion the majority present felt that we should try to make sub-surface measurements and, if not, then make measurements that would lead to future sub-surface measurements. Two types of hard landers were considered. The first was the 'bowling ball' crashing into the surface to examine the plume from orbit. Two members

of the EJSM SDT (Bill Moore and Olga Prieto Ballesteros) pointed out that the SDT had considered that idea, but discarded it as infeasible for a number of technical reasons to do with the collection of data by the spacecraft. We then discussed a relatively high velocity impactor (penetrator) to get to the sub-surface. Bill Moore pointed out that a UK study was looking at this, so this study should look at alternatives. So, the discussion centered on a hard lander of some sort. Science goals identified by our group included understanding the local nature of the surface and sub-surface, both physically and chemically. So, the discussion led to the following measurement goals:

1. Take an image of the surface (similar to that taken by Huygens)
2. Identify local chemical composition of material, possibly spectroscopically.
3. Measure the radiation at the surface.
4. Measure physical properties of the surface e.g. temperature, hardness etc (similar to the measurements made by Huygens).
5. Measure seismic activity with a seismometer.

Pat took the action to relay the discussion of the science and measurement goals to Kevin.

During general discussion throughout the meeting, one or two other topics came up. Notably, there was a sentiment that the astrobiology community was not plugged into either OPAG or the missions. The first is solvable by the ISEFoG participants attending the OPAG meetings (next meeting is Sept. 16-17 in Boulder, CO, <http://www.lpi.usra.edu/opag/>) and making sure that the OPAG steering committee members are aware of the ISEFoG and participate in the meetings (Pat can interface because she is also on the OPAG Steering Committee). Also, hosting the ISEFoG workshop in conjunction with OPAG will help. The second topic of how to 'help or teach' astrobiologists to participate in missions was discussed at length. Pat volunteered that JPL could look into hosting a study with the NAI that ISEFoG members could participate in, so that they could appreciate how studies and missions work. Isik Kanik volunteered that he was looking into this also for the NAI EC. Jonathan Lunine suggested an alternative approach which was more customized and in discussions with Jonathan afterward, we thought maybe an individual mentor program would be helpful. So, thoughts on this topic are welcome and this discussion can be continued by email or at the first quarterly discussion session.

The meeting ended with Pat summarizing the action items which are:

Action Items

1. Arrange Webcast for quarterly meetings – Pat and Kevin
2. Send out names of students/researchers and topics for quarterly discussions – All
3. Coordinate workshop in 2012 with an OPAG meeting – 1 or 2 days before or after.
4. Suggestions for additional topics for ISEFoG workshop - All
5. Contact some of the European Astrobiology centers and investigate what more can be done to further collaboration with ISEFoG – Pat
6. Suggest how astrobiologists could better learn about missions and be involved in the mission studies and future missions – All

7. Investigate mission study opportunities for the NAI at JPL – Pat and Isik Kanik
8. Relay science goals of Europa Surface Science Package to Kevin - Pat